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ACTIVITIES OF THE UNITED NATIONS SYSTEM: ACTIVITIES OF THE DEPARTMENT OF ECONOMIC AND SOCIAL DEVELOPMENT IN SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Activities of the Department of Economic and Social Development in science and technology for development

Report of the Secretary-General

SUMMARY

The present report covers the period between the last session of the Intergovernmental Committee on Science and Technology for Development (April 1991) and the first session of the Commission on Science and Technology for Development (April 1993). While it reflects activities carried out under mandates of the former Intergovernmental Committee on Science and Technology for Development, references are made to the results of the United Nations Conference on Environment and Development, held in Brazil in June 1992, which added a new substantive perspective to the concept of technology cooperation between developed and developing countries. The new perspective is also being reflected in a restructuring of the United Nations Secretariat which aims to revitalize its activities in the economic, social and related fields. In the first phase of this process the Science, Technology, Energy, Environment and Natural Resources Division of the Department of Economic and Social Development assumed the responsibilities of the former Centre for Science and Technology for Development. By the time the new Commission on Science and Technology for Development meets for its first session the second phase will have been accomplished, with the creation of the Department for Policy Coordination and Sustainable Development, the Department for Economic and Social Information and Policy Analysis and the Department for Development Support and Management Services to succeed the Department of Economic and Social Development and thus provide a new institutional framework for science and technology.

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INTRODUCTION

1. The role of science and technology in the development process has received new impetus over the past two years, since the Intergovernmental Committee on Science and Technology for Development met for its final session in April 1991. This impetus is due both to changes within the United Nations system which aim to revitalize activities in the economic, social and related fields and to a new role attributed to technology cooperation between developed and developing countries by the United Nations Conference on Environment and Development. These developments brought about a new perspective with regard to activities in science and technology for development:

(a) A more integrated view of science and technology that would lead to an increased cooperation and synergy between activities in the social and economic fields;

(b) A revival of the call of the Vienna Programme of Action on Science and Technology for Development 1/ for technology cooperation, as a result of the 1992 Earth Summit agreements - in particular, elements of Agenda 21; 2/

2. Increased linkages between activities formerly carried out by such diverse bodies as the United Nations Centre for Science and Technology for Development (covering science and technology policy questions), the Department of International Economic and Social Affairs (addressing the overall economic and social context), the Department of Technical Cooperation for Development (in charge of operational activities) and the Centre on Transnational Corporations (representing the private-sector link) were initiated during the first phase of the restructuring efforts through the Department of Economic and Social Development. The second phase reflects deliberations within the Economic and Social Council following the United Nations Conference on Environment and Development, resulting in the creation of three new departments. All of the above programmes have developed over the years with different backgrounds and mandates. Thus, it will be a particular challenge for the new entities succeeding the Department of Economic and Social Development to maintain the high level of synergy and cooperation needed to overcome long histories of fragmentation within the United Nations system. Furthermore, the 1992 Earth Summit added the new paradigm of "sustainability" to the agenda of science and technology as a cross-cutting issue to be reflected in the further implementation of the Vienna Programme of Action. Careful consideration must therefore be given to the outcome of the United Nations Conference on Environment and Development and the role of technology cooperation in the pursuit of sustainable development.

I. BACKGROUND

3. Science and Technology play an important role in the economic and social development of nations. This was realized by the United Nations at an early stage. In 1949 the United Nations Scientific Conference on the Conservation and Utilization of Resources was convened at Lake Success, New York, becoming the first scientific conference organized under the auspices of the United Nations. In the following decade, in 1955, the United Nations Atoms for Peace Conference

was held. Its explicit scientific purpose was to divert nuclear materials to peaceful purposes.

4. The 1960s and 1970s witnessed two landmark conferences specifically dedicated to applying science and technology to the development of developing countries. The United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, held in Geneva in 1963, sought to demonstrate the means of accelerating development through the application of the latest advances in science and technology. It brought about the conviction that a new and sustained effort by the United Nations was needed to facilitate the transfer of science and technology to developing countries and to help those countries overcome obstacles in access to knowledge and its application. As a result of the Geneva conference, the Economic and Social Council established an Advisory Committee on the Application of Science and Technology for Development. In addition, in 1971, a Committee on Science and Technology for Development was established as a standing committee of the Council.

5. The second major conference in the area of science and technology, the United Nations Conference on Science and Technology for Development, held in Vienna in 1979, reflected discussions during the 1970s on a new economic world order and placed science and technology in the context of international diplomacy. The Vienna conference also represented an awareness that issues of science policy were closely related to questions of economic wealth and to the obstacles faced by developing countries in gaining access to expertise and technology. As a result, new mechanisms were established within the United Nations: a financing system - to become the United Nations Fund for Science and Technology for Development - and the Intergovernmental Committee for Science and Technology for Development. The latter was provided with a secretariat, the Centre for Science and Technology for Development. An Advisory Committee on Science and Technology for Development provided advise on substantive questions related to the implementation of the Vienna Programme of Action in three major areas:

(a) Strengthening the scientific and technological capacities of developing countries;

(b) Restructuring the existing patterns of international scientific and technological relations;

(c) Strengthening the role of the United Nations system in the field of science and technology and the provision of increased financial resources.

6. Within this framework, the Centre - and later its successor, the Science and Technology Branch of the Science, Technology, Energy, Environment and Natural Resources Division of the Department of Economic and Social Development - carried out substantive studies, organized conferences and published reports. Most recently, considerable work has been undertaken in the areas of endogenous capacity-building (with several country projects under way) and technology assessment. Other tasks have included information-related services and the harmonization and coordination of United Nations activities in science and technology through the ACC Task Force on Science and Technology for Development. While the Centre did not have a mandate to operate as an executing

agency, it contributed to the conceptualization of such activities in cooperation with other United Nations bodies such as the Fund.

7. Recent developments have provided a new framework for carrying out science and technology for development within the United Nations. In the spring of 1992, the Secretariat, including its administrative and intergovernmental structure, was reorganized. Science and technology received a broader context within the Science, Technology, Environment, Energy and Natural Resources Division of the Department of Economic and Social Development in the first phase of a series of restructuring efforts. Furthermore, in June 1992, the United Nations Conference on Environment and Development emphasized the need for a new dimension in technology cooperation between developed and developing countries and a stronger emphasis on environmentally sound technologies. The second phase of the restructuring, announced in December 1992, reflected the concerns of the Conference in the establishment of three new departments:

(a) Policy Coordination and Sustainable Development;

(b) Economic and Social Information and Policy Analysis;

(c) Development Support and Management Services.

While these transformations were taking place, activities already initiated under the previous administrative structures were completed or continued, awaiting new guidance from the Commission on Science and Technology for Development. These activities covered endogenous capacity-building and resource mobilization, technology assessment, science and technology information, and harmonization and coordination of science and technology within the United Nations system.

II. SUBPROGRAMMES

A. Endogenous capacity-building and resource mobilization

8. The building of endogenous capacities in science and technology is a crucial factor in determining a nation's ability for economic growth and development and its potential to absorb social, economic or environmental change. This ability requires the existence of institutional, infrastructural and human resources capable of fulfilling basic human needs within a society. Ideally, endogenous capacity-building provides the ability to make informed judgements on matters of science and technology, technology choice, the adaptation and generation of technologies, and, ultimately, the creation of new technologies. The reality in many developing countries often precludes realization of this objective. At the last session of the Intergovernmental Committee, the former Centre reported on projects under way for improving capacities in science and technology in Jordan, Nepal, Thailand and the United Republic of Tanzania. Since 1991, additional projects have been initiated with the Governments of Cape Verde, Jamaica, Pakistan, Togo, Uganda and Viet Nam.

9. Since science and technology are cultural and socio-economic processes, dialogue is at the root of any effective capacity-building. The Centre and its successor within the Department initiated a series of policy dialogues and

specialized expert group meetings in the above-mentioned countries, based on their specific interests. For example, the main objective of the Viet Nam dialogue was to discuss the national situation as the country shifts direction from a centrally planned to a market-oriented economy. Participants in the national dialogue, which was held in June 1992, included scientists, engineers, producers, educators and policy makers. The discussion focused on the role of science and technology in socio-economic development and included a critical review of the existing legislative framework and an infrastructure inventory and assessment. Several initiatives were proposed - among them, the establishment of the Hanoi International Centre for Entrepreneurship, Marketization, Technology Choice and Venture Finance.

10. This general dialogue had been preceded already in December 1991 by a more specialized discussion which focused on the potential of biotechnology in food production in Viet Nam (the results of which are included in issue IX of the ATAS Bulletin). 3/ Researchers representing the field of biotechnology in Viet Nam, individual entrepreneurs and a number of policy makers came together to assess biotechnology in the Vietnamese context. Recommendations were proposed to policy makers, researchers, farmers and commercial enterprises, including a call to strengthen the National Council on Biotechnology, and to establish a Centre for Genetic Engineering and Biotechnology and a National Centre of Excellence. Furthermore, participants recommended a system of quality control and standards, both for domestic production and competitive export products. It was suggested that the research community concentrate, in particular, on complementing traditional approaches in plant breeding and agronomy and on upgrading existing technologies, to carry out in-vitro propagation and micro-propagation of high-value products for the development of virus- and pathogen-free plants of improved quality, and to consider the potential for the production of mushrooms, bio-fertilizers and bio-pesticides.

11. The policy dialogue held in Togo, September 1992, focused on institutional structures, the general direction of scientific research, research areas and intersectoral programmes and specific applications of science and technology in agriculture, engineering, social sciences and human resources. It also analysed requirements such as access to financial resources and university/industry links.

12. A separate and detailed report on the impact of the activities of the United Nations system related to creating and strengthening endogenous capacity-building in science and technology in developing countries is being made available to the Commission during its first session.

B. Technology assessment

13. Technology assessment is a category of policy study that aims to evaluate in broad terms the introduction of new technologies and their effects. It is thus a planning tool for guiding and managing technological change and has been institutionalized in many industrialized and some developing countries through organizations such as the Office of Technology Assessment (United States), the Technology Assessment Office (Germany) or the Technology Information, Forecasting and Assessment Council (India). Other countries are carrying out technology assessment through informal study groups established on an ad hoc

basis between various government agencies, private sector representatives and academics. Within the United Nations system, the General Assembly entrusted the former Centre for Science and Technology for Development in 1989 to serve as the focal point for technology assessment through its Advanced Technology Assessment System (ATAS). By that time, ATAS had already been operating for several years on an experimental basis and had been evaluated by an international expert group.

14. Technology assessment is a dynamic concept that must continually adapt to newly identified problems and emerging technologies. Thus, Agenda 21 specifically calls on the international community, including United Nations agencies, to assist developing countries in building technology assessment capacities for the management of environmentally sound technologies and to strengthen international networking efforts in that context. As a tool for improved technology choice, technology assessment is likely to assist countries' efforts to achieve sustainable development. Yet, most developing countries are still in the process of establishing an adequate infrastructure and an institutional base in terms of science and technology capacities.

15. The Centre and the Science and Technology Branch, through ATAS, carried out studies in different technological areas (biotechnology, micro-electronics, information technology, new materials, energy and environmentally sound technology as well as technology assessment methodology) through ad hoc networks of experts on an international level. The results of these studies have been made available to developing countries. In responding to the need to mobilize technology assessment in the service of sustainable development following the Earth Summit, the Science and Technology Branch assisted initiatives for the establishment of a more continuously operating international network or association through a new global non-governmental organization in technology assessment. A major objective of the organization would be to build a professional technology assessment community through exchange of experiences, expertise and data, along with a particular concern for technology assessment capabilities in developing countries.

1. ATAS publications

16. Since the eleventh session of the former Intergovernmental Committee, four assessment reports have been published in the ATAS Bulletin: "Energy systems, environment and development" (autumn 1991), "Environmentally sound technology for sustainable development" (spring 1992), "Prospects for photovoltaics: commercialization, mass production and application for development" (forthcoming, spring 1993), and "Biotechnology and development: expanding the capacity to produce food" (forthcoming, spring 1993) as described below. 4/

17. Although developing countries account for only 28 per cent of global commercial energy consumption, more than one third of this amount is derived from coal, the production and consumption cycle of which can be a major source of soil, water and air pollution and of greenhouse gases. Furthermore, many developing countries are characterized by a dual energy economy composed of a connected and a disconnected energy sector. The study on energy systems, published by the former Centre, analysed the local demand and supply-side characterization of both sectors as well as technologies for transportation. It

looked at specific case-studies carried out in developing countries and provided planning and policy options.

18. The study on environmentally sound technology is a comprehensive and detailed contribution to the international debate on the role of technology in environment and development. Technology cooperation between developed and developing countries in this area was also one of the issues debated at the United Nations Conference on Environment and Development. The study includes a conceptual framework, an analysis of the technological responses to global environmental concerns, national policies, international cooperation and global prospects.

19. The report on photovoltaics is the result of an international workshop held in Sao Paulo, Brazil, from 16 to 20 September 1991. The 1990s are expected to bring about a strong increase in the sales of photovoltaic systems whose output may range from a few watts to large-scale commercial applications. Mass production of these systems and refinements to the technology will be reflected in continued lower costs. The report examines the state of the art in photovoltaic technologies, with special attention to problems of dissemination and market penetration.

20. Developing countries are rich in genetic resources, and biotechnology offers the potential of exploiting such resources to increase food production, improve the quality of food, adapt crops to harsh environmental conditions and lengthen the "shelf-life" of food through processing technologies. The effect on agriculture is not purely a technical issue, but also involves a broad variety of areas such as conservation of genetic diversity and improved land use and distribution. The ATAS Bulletin of November 1984 (ST/STD/ATAS/1) had already addressed the issue of tissue culture technology and development. The current ATAS project and the Bulletin report on biotechnology involves workshops carried out with local scientists in Africa and Asia and focuses on the role and potential of biotechnology for food production in three specific contexts: national strategies; risk management; and commercialization.

21. Future topics for the ATAS Bulletin are "conversion of military to civilian production" and "remote sensing and development".

22. In addition to the ATAS Bulletin, the Science and Technology Branch continued to publish ATAS News on a quarterly basis as a regular supplement to its newsletter Update. The objectives of ATAS News are to inform scientists and planners of initiatives in technology assessment and forecasting, to serve as an information medium for the networks established by ATAS and to highlight the implications of new technologies in developing countries.

2. ATAS workshops, expert group meetings and conferences

23. In pursuance of the recommendations expressed by a group of independent experts who evaluated ATAS in 1988 at the request of the Intergovernmental Committee, the Committee decided at its tenth session (1989) to assign the Centre (later the Branch) the task of functioning as a focal point for technology assessment within the United Nations system and to carry out technology assessment studies for the General Assembly.

24. In carrying out this mandate, several workshops, expert group meetings and conferences were organized to examine technology assessment methodology and institutionalization as well as more specific assessments of conversion possibilities and clean coal technology.

25. The Centre convened, in cooperation with the Office of Technology Assessment of the United States Congress, the United Nations Workshop on Technology Assessment for Developing Countries, from 4 to 7 November 1991. The workshop brought together about 30 specialists and practitioners from developing and developed countries representing the fields of technology assessment, technology choice and acquisition, planning and decision-making. The workshop highlighted factors relevant to the selection of technologies, capacity-building, experiences through case-studies and networking.

26. New Technologies: Opportunities and Risks for the Environment was the title of an expert group meeting organized by the Centre in cooperation with the Industry and Environment Programme Activity Centre of the United Nations Environment Programme (UNEP), the French Ministry of the Environment and the United States Environmental Protection Agency, held in Geneva, from 13 to 14 January 1992. Although technology assessment has been recognized for many years, environmental effects of new technologies have not been sufficiently assessed. The meeting tried to close some of the existing gaps through case-studies, identification of the essential elements of technology assessment for environmentally sound development and obstacles to an effective use of technology assessment, including a definition of specific areas of need and action.

27. The international expert group meeting on technology assessment, monitoring and forecasting, held in Paris from 25 to 28 January 1993, in cooperation with UNESCO, followed up on the joint meeting with the Office of Technology Assessment with a more comprehensive examination of the methodological issues of introducing technology assessment in a developing country. The meeting discussed economic, social, and environmental impact assessment methodologies and practices and the major factors that are likely to foster technology assessment in the governmental or private sectors. Furthermore, it specified the role that a technology assessment focal point could play within the United Nations system, in implementation of the request of the General Assembly. A detailed report of the meeting will be made available to the Commission.

3. ATAS network development

28. An integrated element of ATAS relates to the building of an international network in technology assessment. In connection with the Paris expert group meeting, a special session of technology assessment institutions took place to discuss the proposal to create a new international non-governmental organization or network in the area of technology assessment. The major task of the network would be to link up developing country institutions to related activities in the industrialized world. The initiative had emerged at the meeting held with the Office of Technology Assessment in Washington in 1991 and had been assisted by the Science and Technology Branch through a global survey of technology assessment institutions and their needs. Furthermore, informal consultations among technology assessment institutions had been held on previous occasions.

Thus, the staff of the Science, Technology, Environment and Natural Resources Division had participated in international forums such as the annual conference of the International Association for Impact Assessment (IAIA), convened at the World Bank in Washington, D.C. (August 1992) and the European Congress on Technology Assessment, held in Copenhagen, Denmark (November 1992) to expand contacts with institutions world wide. The first organizational steps to establish the new non-governmental organization were taken at the special session in Paris.

4. Technology assessment training

29. In cooperation with the International Association for Impact Assessment, the United Nations Fund for Science and Technology for Development and the State Science and Technology Commission of China, the Science and Technology Branch is preparing a training course on technology assessment and management, to be held in Shanghai in June 1993 in conjunction with the annual IAIA conference. The course is aimed at improving the skills of professionals from China, East Asia and South-East Asia in applying technology assessment methodology in decision-making.

5. Other substantive activities assessment

30. Specific applications of technology assessment were the focus of two conference series - on conversion of the military/industrial complex to peaceful uses, and on clean coal technologies - related to the technology assessment subprogramme.

31. The international arms trade today is, according to a study by the Office of Technology Assessment, an international buyers market in which modern tanks, artillery, fighter aircraft, missiles, submarines and other weapons are generally available to any nation that can pay for them. Sellers come from developed and developing countries alike. How can the international community cope with these trends and how can the United Nations translate the favourable political climate following the end of the cold war between East and West into an active policy of disarmament? These were the major questions addressed at the Beijing Conference on International Cooperation in Peaceful Uses of Military/Industrial Technology (22-26 October 1991). The Conference was organized by the China Association for Peaceful Uses of Military Industrial Technologies in cooperation with the former Centre. The shift from military to civilian production is difficult in industrialized and developing countries and most difficult in countries which, under previous policies, have established large-scale military/industrial complexes. International cooperation plays a crucial role in overcoming these problems through research partnerships, arrangements between companies of different countries, and development cooperation.

32. The second conference in the "conversion" series, Conversion: Opportunities for Development and Environment, took place in Dortmund, Germany (24-27 February 1992), in cooperation with the Institute for Environmental Protection and the State Government of Northrhine-Westfalia, the United Nations Secretariat Department for Disarmament Affairs and other United Nations

organizations. Participants addressed the political, economic and legal ramifications of the process of conversion, the role of the United Nations, options for reinvesting a possible "peace dividend" resulting from declining military budgets, and the transfer of technology and know-how to developing countries.

33. The third conference related to conversion took place from 12 to 16 October 1992 in Moscow, with a specific focus on the conversion of the aerospace industry which, in economic terms, is a leading sector of the global defence industry. It is the most advanced technologically and is the major contractor of defence-related research and development. The conference, entitled Technology Assessment in Conversion for Development, was organized jointly by the United Nations and the Government of the Russian Federation.

34. The second conference series, organized by the former Centre and, since the last session of the Intergovernmental Committee, the current Branch, focused on clean coal technology and involved meetings in Beijing (December 1991), Madras (January 1992) and Berlin (May 1992). With China's rapid economic expansion, pollution from coal-burning is unlikely to abate soon, given a lack of resources for an immediate overhaul of the country's energy system. Instead, China will have to rely on a combination of environmental management and rational energy use. India faces similar problems. Clean-coal technologies are needed at all stages of the energy production and consumption cycles, but developing countries and economies in transition will need greatly improved access to environmentally sound alternatives if their contributions of CO_2 to global warming are to be contained. The international round table on environmentally sound coal technologies which concluded the series in Berlin, noted that many developing countries and economies in transition look to coal-fired plants to provide needed electric power and have no short-term alternatives to meet their expanding needs. The Berlin meeting strongly recommended that strategies for reducing greenhouse emissions should be linked to measures that address areas of poverty, population patterns, economic growth and international trade. Furthermore, it was proposed that regional and global clean-coal technology centres be established to focus on technologies and related policies. This conference series also had vital linkages to the activities of the Division's Energy Branch.

35. The Remote Sensing Section of the former Department of Technical Cooperation for Development has become an integral part of the Science and Technology Branch of the Division following the first phase of restructuring. an interregional seminar on remote sensing and the transfer of technology, held in Washington, D.C. (2-14 August 1992), was co-sponsored by the Department and the International Society for Photogrammetry and Remote Sensing. The seminar covered the viewpoints of manufacturers and users of remote-sensing technologies, with a particular focus on technology transfer and the needs of developing countries. Issues addressed included the need to accelerate the transfer of new mapping and remote-sensing technologies, the importance of guidelines for State policies in the science and technology sector, on-the-job training and overseas fellowships, and adequate technology choice.

C. Science and technology information

36. The Science and Technology Branch continues to maintain a registry of national science and technology focal points identified by member States and keeps them regularly informed about science and technology activities within the United Nations system. The Branch also provides them with publications issued by the Division, including the periodic newsletter Update. Update was originally established by the former Centre to provide information on the progress made in implementation of the Vienna Programme of Action on Science and Technology for Development, but publication has taken a broader view of this theme over the past years by reporting on other institutions' activities as well. In the course of restructuring, Update has evolved into a newsletter that represents all of the Division's science- and technology-related activities. It continues to carry the ATAS News technology assessment supplement as a regular feature. It is distributed free of charge to all member States, national focal points and relevant intergovernmental and non-governmental organizations, and to individuals, on request.

37. A proposal by United Nations University (UNU) and the former Centre to establish a United Nations register of research received further study. It was agreed that the register should be implemented by UNU and the Science and Technology Branch in a phased manner to gradually encompass research carried out by the United Nations in science and technology as well as in the political, economic and social fields. The register was intended for the use of the United Nations system, Governments, aid agencies, and other organizations concerned with research policy and planning, and by the international community of scholars and scientists.

38. The Division continued the series of in-house seminars inaugurated by the Centre whereby visitors invited to the United Nations give lectures in their areas of expertise and exchange views with the staff.

D. Harmonization and coordination of science and technology within the United Nations

39. Inter-agency cooperation and coordination has continued through the work of the ACC Task Force on Science and Technology for Development. A Task Force meeting scheduled for the spring of 1992 was postponed to November 1992 in order to allow time for consideration of the outcome of a revitalization of the ACC machinery by the Secretary-General. Furthermore, the new date also provided the opportunity to take into consideration the results of the United Nations Conference on Environment and Development and its implications for science and technology activities within the United Nations system. The Task Force met in November, and a separate report on ways and means of improving the quality of coordination and cooperation in science and technology for development is being provided to the Commission. The future role of the Task Force is under discussion.

E. Substantive themes and expert group meetings

40. The Intergovernmental Committee had proposed that the substantive theme of its next planned session would be the contribution of technologies, including new and emerging ones, for the industrialization of developing countries and for the strengthening of regional and global integration processes, including proposals on ways and means of transferring such technologies and for their incorporation in the productive sector of those countries. Although the Committee has been abolished, the report requested by it has been completed by the Division and is brought to the attention of the Commission at its first session in a separate document.

41. The effect of science and technology on the development prospects of the least developed countries was the focus of the last ad hoc panel/workshop convened by the former Advisory Committee on Science and Technology for Development, in Bujumbura, Burundi, from 4 to 8 May 1992. A separate report from the workshop is available to the Commission.

III. NEW PERSPECTIVES

A. Cooperation and synergy of activities

42. The synergy of activities relevant to science and technology for development within the Department of Economic and Social Development during the first phase of the restructuring of the United Nations in the economic, social and related fields brought together projects that reflected policy studies carried out under the former Centre, social and economic perspective studies under the mandate of the former Department of International Economic and Social Affairs, operational activities through the former Department of Technical Cooperation for Development and specialized studies concerning the role of transnational corporations under the former United Nations Centre on Transnational Corporations. While the major work on science and technology was being carried out by the Science and Technology Branch of the Science, Technology, Environment and Natural Resources Division within the Department, a significant number of activities performed by other units of the Department have programme elements relevant to science and technology.

43. Thus, the former Department of International Economic and Social Affairs assisted developing countries in strengthening their capabilities for processing statistical data through the use of new technologies and enhancing their abilities for developing and maintaining databases. A major document published by the Department, Report on the World Social Situation, addresses science and technology in relation to societal concerns.

44. The former Department of Technical Cooperation for Development had acquired specific competence in carrying out capacity-building operational activities. Its energy, mineral resources, water resources and physical infrastructure units became an integral part of the new Division in the course of the first phase of restructuring, with the addition of a new Environment and Sustainable Development Unit. Together, they cover a wide range of operational activities. Thus, the Mineral Resources Branch assisted the China Geological Institute in establishing a modern system of computerized exploration field data acquisition

and processing by providing hardware, software and training. Furthermore, the Branch convened the Interregional Seminar on Guidelines for the Development of Small/Medium-scale Mining in Harare, Zimbabwe, in February 1993. Its purpose was to produce guidelines for the development of small and medium-scale mining enterprises in developing countries by identifying the parameters and conditions needed to stimulate such development. Some 100 participants were drawn from the policy-making level of ministries of mines from developing countries.

45. A major part of technology transfer world wide is being carried out not by Governments and development cooperation but by transnational corporations and their subsidiaries in developing countries. A report on transnational corporations and economic growth through technology, submitted by the former Centre on Transnational Corporations to the Commission on Transnational Corporations in 1992 (E/C.10/1992/4), highlighted the role of transnational corporations in economic growth and the particular function of technological development in this context, as well as the resulting policy implications.

46. The Long-term Socio-economic Perspectives Branch prepared a report on structural change in the world economy: implications for energy use and air emissions, which provides estimates of energy use during the next three decades on the basis of likely structural and technical changes in the world economy. The projections of energy use made by the study assumed a widening application of existing technologies already used in some countries for the reduction of specific emissions. The Branch intends to prepare a more extensive technical publication on the foregoing topic and to continue to update assumptions about future technology embedded in the United Nations Global Input/Output Model. The model will also be used for the Secretary-General's mid-decade report on the overall socio-economic perspective of the world economy.

47. The Population Division's primary contribution to science and technology is in the area of demography: biennial demographic estimates and projections are prepared for all countries of the world covering the period 1950-2025. Long-range projections are produced on a regional and global basis. The Division also convenes expert group meetings and carries out special studies on issues such as child mortality, AIDS and the interrelationship between population, environment, resources and development. In addition, the Division prepares population databases and computer software for demographic analysis and provides technical support and cooperation to Governments requesting assistance.

48. These activities described above are not an exhaustive account of all science- and technology-related activities carried out by the various components of the Department, but exemplify the complexity of the measures necessary for building science and technology capacities in developing countries.

B. United Nations Conference on Environment and Development, science and technology

49. Principle 9 of the Rio Declaration on Environment and Development, 2/ adopted by the United Nations Conference on Environment and Development, explicitly refers to science and technology:

"States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies."

50. Furthermore, another document adopted by the Conference, Agenda 21, 2/ contains several references to the role of science and technology in sustainable development. This concerns particularly the access to and transfer of environmentally sound technology, capacity-building for technology management, human resource development, data and information, technology assessment research, and the acquisition, dissemination and generation of environmentally sound technologies.

51. The experiences of the Department that correspond to the recommendations of the Conference in the field of science and technology include the application of technology assessment, support to the development of national strategies and capacity-building for the effective acquisition and adaptation of environmentally sound technologies, and facilitating access to expertise and technology. Thus, the new departmental entities are structured so as to contribute effectively to the implementation of those areas of Agenda 21 that deal with the transfer of environmentally sound technology, science for sustainable development, and national mechanisms and international cooperation for capacity-building.

C. Future directions

52. In pursuance of the "social progress and better standards of life in larger freedom" demanded by the Charter of the United Nations, the United Nations has a role in international science policy, particularly in preventing the world from being divided into areas either connected to or disconnected from the benefits of modern science and technology. Responsibility lies in enhancing the capacities of developing countries in science and technology in every respect, removing obstacles from access to scientific and technological information and providing those countries with the means to manage global environmental change through the acquisition of environmentally sound technologies. The new Commission on Science and Technology for Development faces the challenge of defining the exact role of the United Nations, through the new organizational arrangements within the United Nations Secretariat or other mechanisms, and what it can and should perform. It will be necessary to identify further specific areas where the United Nations as an international organization has a comparative advantage and can play a clear and advantageous role and to identify where its limits lie.

53. Many of the hopes raised by the Vienna Programme of Action, adopted by the United Nations over a decade ago, remain unfulfilled. The United Nations Conference on Environment and Development has revitalized the idea of technology cooperation between developed and developing countries, providing a new impetus to applying science and technology to development. The Vienna Programme of Action, in its preamble, stated that "the necessary resources and technological potentials exist for eliminating the underdevelopment of developing countries

and for improving the well-being of humanity as a whole". 1/ This is even more true today.

Notes

1/ See Report of the United Nations Conference on Science and Technology for Development, Vienna, 20-31 August 1979 (Sales No. E.79.I.21), chap. I.

2/ "Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992" (A/CONF.151/26 (vol. I), chap. I.

3/ United Nations publication, Sales No. E.92.II.A.15.

4/ United Nations publications, Sales Nos. E.91.II.A.4, E.92.II.A.6, E.93.II.A.14 and E.93.II.A.15, respectively.